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Applicant		
EXXONMOBIL UPSTREAM RESEARCH COMPANY		
Title of the Invention		
A WELLBORE APPARATUS AND METHOD FOR COMPLETION, PRODUCTION AND INJECTION		

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RESPONSE TO WRITTEN OPINION MAILED 9 FEBRUARY 2005

This communication is a response under PCT Article 34 to the Written Opinion of the International Searching Authority mailed February 9, 2005 and a telephonic interview, which was conducted with the undersigned and the Examiner on 4 May, 2005. In the telephonic interview, proposed claim amendments were discussed with the Examiner to clarify the claimed subject matter. Applicants appreciate the Examiner's consultation regarding the prior art and the amendments to the claims, which are discussed further below.

In the Written Opinion, the Examiner indicated the status of various claims. In particular, the Examiner indicated that claims 6 and 43 satisfy the novelty and it is assumed the inventive step requirement under PCT Article 33(2-3), while the Examiner indicated that claims 12, 24, 25, 28, 29 and 42 satisfy the inventive step

requirement under PCT Article 33(3). Further, the Examiner asserted that claims 1-5, 7-11, 13-23, 26, 27, 30-41 and 44-47 lacked both novelty and inventive step under PCT Article 33(2-3). To support this assertion regarding claims 1-5, 7-11, 13-23, 26, 27, 30-41 and 44-47, the Examiner relied upon U.S. Patent No. 5,318,119 to Lowery et al. (herein referred to as "Lowery") in combination with U.S. Patent No. 3,556,219 to Meldau (herein referred to as "Meldau") or U.S. Patent No. 4,064,938 to Fast (herein referred to as "Fast").

While Applicants thank the Examiner for the indication relating to claims 6, 12, 24, 25, 28, 29, 42 and 43, Applicants have amended the independent claims 1, 20, 36 and 44, along with dependent claims 11, 15-17, 24-26, 28, 30-35, 37-39, 41-43, 45 and 46 to further clarify the claimed subject matter. Further, Applicants have added new claims 48-81, which are directed to certain additional embodiments disclosed in the present application. Finally, Applicants have attached to this response an information disclosure statement that cites additional references. Hence, in the present response, Applicants present amendments that clarify the claims and arguments relating to at least some of the distinctions between the references cited by the Examiner and subject matter of claims 1-81.

With regard to the claims, Applicants have included replacement sheets 19-31 in a clean version of the pending claims along with a marked-up set of the claims. The marked-up version of the claims provides the details for the specific amendments present in the clean version of the claims. To begin, independent claims 1, 20, 36 and 44 have been amended to further clarify the teachings of the present application. In particular, claim 1 has been amended to recite "at least one wall inside the first flow joint or the second flow joint to form at least a third fluid flow path," while claim 20 has been amended to include the recitation "at least one wall disposed inside and coupled to the first selectively perforated basepipe or the second selectively perforated basepipe to provide at least one additional fluid flow path" along with some amendments to clarify antecedent basis within the claim. Similarly, claim 36 has been amended to recite "at least one wall disposed in the first flow joint or the second

flow joint to form at least a third fluid flow path," while claim 44 has been amended to recite "at least one wall inside the first flow joint or the second flow joint to provide at least a third fluid flow path." Each of these amendments further clarifies the claimed subject matter and is clearly supported in the specification (*See* e.g., Application, Figs. 3A-6B; p. 12, line 12 to p. 18, line 28). Further, Applicants have amended claims 11, 15-17, 24-26, 28, 30-35, 37-39, 41-43, 45 and 46 to clarify the claimed subject matter. These amendments are not believed to limit the claims, but merely clarify the claimed subject matter. Finally, Applicants have added new claims 48-81, which are again clearly supported in the present application (*See* e.g., Application, Figs. 3A-6B; p. 12, line 12 to p. 18, line 28). In particular, independent claim 68 includes the recitations of claims 1 and 6 in independent form. As such, because each of these amendments and new claims are fully supported by the specification, Applicants respectfully request the Examiner replace the existing pages 19-25 with the attached replacement sheets 19-31.

In contrast to the claimed subject matter, Lowery teaches a method of attaching a sintered metal screen to a base pipe to resist rough handling of the screen. *See* Lowery, col. 3, lines 15-20. In Lowery, sand screens S1, S2, S3, S4 are connected to tubular mandrels 44 that each include radial bore passages 56. *See id.* at Figs. 2-4, col. 6, lines 24-59. Each of the tubular mandrels 44 are coupled together in series by spacer ring 58 and seal rings 60 and 62. *See id.* at Figs. 2-3, col. 7, lines 29-43. In this configuration, a flow path for formation fluid into the inner portion of the tubular mandrels 44 is the only flow path provided by each tubular mandrel 44. *See id.* As such, Lowery simply teaches that a single flow path from the formation into the tubular mandrel through the respective sand screens S1, S2, S3, S4 and radial bore passages 56. Accordingly, Lowery does not provide or suggest first and second flow joints, much less, a wall inside the first flow joint or the second flow joint to create an additional fluid flow path through the wellbore.

Similar to Lowery, Fast teaches a sand screen assembly with two walled deflectors around a sand screen to protect the sand screen. *See* Fast, col. 2, lines 24-

34. In particular, an inner sleeve 14 and an outer sleeve 16 having openings 17 and are positioned around a wire screen 12 by spacers 18. *See id.* at Figs. 2-3, col. 2, line 67 to col. 3, line 14. In all of the Fast configurations, openings 17 in the sleeves 14 and 16 are large enough to allow sand particles to pass through the openings and contact the wire screen 12. *See id.* at col. 4, lines 14-20. That is, the sleeves 14 and 16 are used to deflect sand particles to reduce potential damage to the wire screen 12, not to provide first and second fluid flow paths. Further, the spacers 18 are merely utilized to fix the position of the sleeves 14 and 16 to provide a single indirect flow path from the formation to the wire screen 12. As such, Fast does not provide or suggest first and second flow joints, much less, a wall inside the first flow joint or the second flow joint to create an additional fluid flow path through the wellbore.

Finally, Meldau teaches a gravel packed liner that is utilized to produce oil from a well. *See* Meldau, col. 1, lines 4-16. In Meldau, a liner 6 is held against an interior wall of a perforated casing 2 by positioners 7 and surrounded by gravel packing 8 within the perforated casing 2. *See id.* at Fig. 2, col. 2, lines 47-70. The positioners 7 are simply utilized to locate the liner to a specific location to allow sand or clay to impact the gravel packing 8, not the liner 6. In an alternative configuration, a liner 10 is held against an interior wall of the casing 2 by a tailpipe 11 and the tailpipe 11 and liner 10 are surrounded by gravel packing 8 within the perforated casing 2. *See id.* at Figs. 4 and 5, col. 3, lines 25-46. In this configuration, the tailpipe 11 does not have any slots or perforations because the liner 10 and tailpipe 11 are utilized to separate the oil and gas within the liner 10. *See id.* As such, regardless of the configuration, Meldau does not provide or suggest first and second flow joints, much less, a wall inside the first flow joint or the second flow joint to create an additional fluid flow path through the wellbore.

Because the references, alone or in combination, fail to provide or suggest the claimed subject matter, claims 1-81 are believed to satisfy the novelty and inventive step requirements under PCT Article 33(2-4). Accordingly, Applicants respectfully

request that the international preliminary examination report be reconsidered and revised to state that all claims have novelty and inventive step.

Respectfully submitted,

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CLAIMS

What is claimed is:

1. A wellbore apparatus comprising:

a) a first flow joint in a wellbore, the first flow joint comprising at least one three-dimensional surface defining a first fluid flow path through the wellbore, at least one section of the first flow joint surface being permeable and at least one section of the first flow joint surface being impermeable;

b) a second flow joint in thea wellbore, the second flow joint comprising at least one three-dimensional surface defining a second fluid flow path through the wellbore, at least one section of the second flow joint surface being permeable and at least one section of the second flow joint surface being impermeable;

c) at least one wall inside the first flow joint or the second flow joint to form at least a third fluid flow path; and

ed) wherein at least one permeable section of the first flow joint is connected to at least one permeable section of the second flow joint thereby providing at least one fluid flow path between the first flow joint and the second flow joint.

2. The apparatus of claim 1 wherein the first and second flow joints are selectively perforated basepipes.

3. The apparatus of claim 1 wherein the first flow joint is adjacent to the second flow joint in the wellbore.

4. The apparatus of claim 1 wherein the first flow joint is concentric to the second flow joint in the wellbore.

5. The apparatus of claim 1 wherein at least one flow joint comprises joints of pipe.

6. The apparatus of claim 1 wherein the first flow joint is eccentric to the second flow joint in the wellbore.

7. The apparatus of claim 5 wherein the joints of pipe are connected using flexible joints.

8. The apparatus of claim 1 wherein the three-dimensional surface of the first and second flow joints are cylindrical.

9. The apparatus of claim 1 wherein at least one wellbore annuli is utilized as a flow joint.

10. The apparatus of claim 1 wherein at least one flow joint is a sand screen.

11. The apparatus of claim 10 wherein the sand screen is a wire-wrapped screen and the wires of the wire-wrapped screen are wrapped at varying pitches thereby creating varying levels of permeable sections and impermeable sections.

12. The apparatus of claim 1 further comprising at least one shunt tube in at least one flow joint.

13. The apparatus of claim 1 wherein the apparatus is used for producing hydrocarbons.

14. The apparatus of claim 1 wherein the apparatus is used for gravel packing a well.

15. The apparatus of claim 1 wherein at least one impermeable section of the first flow joint or the second flow joint and at least one permeable section of the first flow joint or the second flow joint are each at least 7.5 centimeters long.

16. The apparatus of claim 1 wherein at least one impermeable section of the first flow joint or the second flow joint and at least one permeable section of the first flow joint or the second flow joint are each at least 15 centimeters long.

17. The apparatus of claim 1 wherein at least one impermeable section of the first flow joint ~~at least one flow joint~~ is adjacent to at least one permeable section of a third~~n adjacent~~ flow joint.

18. The apparatus of claim 1 wherein at any cross-section location of the apparatus, at least one wall of at least one flow joint is impermeable.

19. The apparatus of claim 1 wherein at any cross-section location at least one wall of at least one flow joint is impermeable and at least one wall of at least one flow joint is permeable.

20. A wellbore apparatus comprising;

a) a first selectively perforated basepipe inside a~~the~~ wellbore defining a first fluid flow path through the wellbore, with at least one section of the first selectively perforated basepipe being impermeable and at least one section of the first perforated basepipe being permeable;

b) a second selectively perforated basepipe inside the wellbore defining a second fluid flow path through the wellbore, with at least one section of the second selectively perforated basepipe being impermeable and at least one section of the second perforated basepipe being permeable;

c) at least one wall disposed inside and coupled to the first selectively perforated basepipe or the second selectively perforated basepipe to provide at least one additional fluid flow path; and

~~e~~d) wherein at least one permeable section of the first selectively perforated basepipe and at least one permeable section of the second selectively perforated basepipe ~~basepipes~~ are connected to provide at least one flow path between the first selectively perforated basepipe and the second selectively perforated basepipe.

21. The apparatus of claim 20 wherein the basepipes are concentric.

22. The apparatus of claim 20 wherein the basepipes are eccentric.

23. The apparatus of claim 20 wherein the basepipes are adjacent.

24. The apparatus of claim ~~20~~ 21 wherein the first selectively perforated basepipe ~~at least one concentric basepipe~~ is larger than the second selectively perforated basepipe~~at least one concentric basepipe~~ and ~~further comprising~~the at least one ~~additional~~ wall is coupled between the first selectively perforated basepipe and the second selectively perforated basepipe ~~inside the larger basepipe~~ to provide at least one additional flow path inside the first selectively perforated basepipe~~outer basepipe~~.

25. The apparatus of claim ~~20~~ 22 wherein the first selectively perforated basepipe is larger than the second selectively perforated basepipe and the at least one wall is coupled between the first selectively perforated basepipe and the second selectively perforated basepipe to provide at least one additional flow path inside the first selectively perforated basepipe~~at least one eccentric basepipe is larger than at least one eccentric basepipe and further comprising at least one additional wall inside the larger basepipe to provide at least one additional flow path inside the outer basepipe~~.

26. The apparatus of claim 20 wherein the perforations of the first selectively perforated basepipe are chosen based on the relative amount of fluids that will flow through the at least one permeable section.

27. The apparatus of claim 20 wherein the wellbore annulus is utilized as an additional flow joint.

28. The apparatus of claim 20 further comprising at least one shunt tube in the first selectively perforated basepipe or the second selectively perforated basepipe~~at least one flow joint~~.

29. The apparatus of claim 20 wherein at least three flow paths are available through the wellbore.

30. The apparatus of claim 23 wherein the first selectively perforated basepipe and the second selectively perforated basepipe ~~adjacent joints of pipe~~ are connected with flexible tubes.

31. The apparatus of claim 20 wherein at least one impermeable section of the first selectively perforated basepipe or the second selectively perforated basepipe and at least one permeable section of the first selectively perforated basepipe or the second selectively perforated basepipe are each at least 7.5 centimeters long.

32. The apparatus of claim 20 wherein at least one impermeable section of the first selectively perforated basepipe or the second selectively perforated basepipe and at least one permeable section of the first selectively perforated basepipe or the second selectively perforated basepipe are each at least 15 centimeters long.

33. The apparatus of claim 20 wherein at least one impermeable section of the first selectively perforated basepipe or the second selectively perforated basepipe~~section of at least one flow joint~~ is adjacent to at least one permeable section of a third ~~n adjacent~~ selectively perforated basepipe~~flow joint~~.

34. The apparatus of claim 20 wherein at any cross-section location of the apparatus, at least one wall of ~~at least one~~ the first selectively perforated basepipe or the second selectively perforated basepipe ~~flow joint~~ is impermeable.

35. The apparatus of claim 20 wherein at any cross-section location at least one wall of ~~at least one~~ the first selectively perforated basepipe or the second selectively perforated basepipe ~~flow joint~~ is impermeable and at least one wall of the other one of the first selectively perforated basepipe and the second selectively perforated basepipe~~at least one flow joint~~ is permeable.

36. A method for completing a wellbore comprising:

a) providing a wellbore apparatus for producing hydrocarbons comprising a first flow joint in a wellbore, the first flow joint comprising at least one three-dimensional surface defining a first fluid flow path through the wellbore with at least

one section of the first flow joint surface being permeable and at least one section of the first flow joint surface being impermeable, a second flow joint in a wellbore, the second flow joint comprising at least one three-dimensional surface defining a second fluid flow path through the wellbore with at least one section of the first second flow joint surface being permeable and at least one section of the first second flow joint surface being impermeable, at least one wall disposed in the first flow joint or the second flow joint to form at least a third fluid flow path, wherein at least one permeable section of the first flow joint is connected to at least one permeable section of the second flow joint thereby providing at least one fluid flow path between the first flow joint and the second flow joint;

b) installing the wellbore apparatus in the wellbore .

37. The method of claim 36 wherein installing the wellbore apparatus provides at least two separate flow paths in the wellbore with at least one connection permitting fluid flow between the first flow path and the second flow path~~flowpaths~~.

38. The method ~~apparatus~~ of claim 36 wherein the apparatus is used for producing hydrocarbons.

39. The method ~~apparatus~~ of claim 36 wherein the apparatus is used for gravel packing a well.

40. The method of claim 36 further comprising producing hydrocarbons from the wellbore.

41. The method of claim 40 further comprising producing hydrocarbons from the wellbore apparatus after the first flow joint, second flow joint or third flow joint has been mechanically damaged.~~Hydrocarbons that are produced according to claim 40.~~

42. The method of claim 36 further comprising disposing at least one shunt tube in at least one of the first flow joint and the second flow joint, and gravel packing the wellbore using the shunt tube in the first flow joint or the second flow joint~~flow joint~~.

43. The method of claim 36 wherein the first flow joint or the second flow joint is a sand screen; and further comprising installing a complete gravel pack during gravel packing operations after the sand screen has been mechanically damaged.

44. A method of flowing fluids in a wellbore comprising;

a) providing a wellbore with an apparatus comprising a first flow joint in a wellbore, the first flow joint comprising at least one three-dimensional surface defining a first fluid flow path through the wellbore with at least one section of the first flow joint surface being permeable and at least one section of the first flow joint surface being impermeable, a second flow joint in a wellbore, the second flow joint comprising at least one three-dimensional surface defining a second fluid flow path through the wellbore with at least one section of the second flow joint surface being permeable and at least one section of the second flow joint surface being impermeable, wherein at least one permeable section of the first flow joint is connected to at least one permeable section of the second flow joint thereby providing at least one fluid flow path between the first flow joint and the second flow joint, and at least one wall inside the first flow joint or the second flow joint to provide at least a third fluid flow path.

45. The method of claim 44 further comprising producing hydrocarbons through the first flow joint or the second flow joint.

46. The method of claim 44 further comprising injecting fluids into the well through ~~the~~ the first flow joint and the second flow joints.

47. A method of manufacturing a wire-wrapped screen, the improvement comprising;

wrapping the wire at varying pitches wherein at least one section of the wire wrapped screen is permeable and at least one section of the wire-wrapped screen is impermeable.

48. A wellbore apparatus comprising;

a first perforated basepipe configured to provide a first fluid flow path through a wellbore, wherein the first perforated basepipe has at least a first impermeable section and at least a first permeable section;

a second perforated basepipe configured to provide a second fluid flow path through the wellbore, wherein the second perforated basepipe has at least a second impermeable section and at least a second permeable section and the first permeable section and the second permeable section are connected to provide a flow path between the first perforated basepipe and the second perforated basepipe; and

at least one baffle disposed inside the first perforated basepipe or the second perforated basepipe to provide at least one additional fluid flow path.

49. The apparatus of claim 48 wherein the basepipes are concentric.

50. The apparatus of claim 48 wherein the basepipes are eccentric.

51. The apparatus of claim 48 wherein the basepipes are adjacent.

52. The apparatus of claim 48 wherein the at least one baffle is coupled between the first perforated basepipe and the second perforated basepipe to form compartments within the first perforated basepipe.

53. The apparatus of claim 48 wherein the at least one baffle comprises a first wall, a second wall and a third wall that are utilized to compartmentalized fluid flow paths within the first perforated basepipe or the second perforated basepipe.

54. The apparatus of claim 48 wherein the at least one baffle comprises at least one wall to at least partially divide the fluid flow.

55. The apparatus of claim 48 wherein the at least one baffle comprises a plurality of walls to create a plurality of compartments to redirect the fluid from the wellbore.

56. The apparatus of claim 48 wherein the at least one baffle comprises a plurality of baffles disposed in axial locations within the first perforated basepipe or second perforated basepipe to redirect fluid into a plurality of compartments.

57. The apparatus of claim 48 wherein the first perforated basepipe is a sand screen.

58. The apparatus of claim 48 wherein the at least one baffle forms a predefined shape and the at least one baffle comprises at least one of permeable surfaces, impermeable surfaces, and combination thereof.

59. A wellbore apparatus comprising:

a perforated basepipe configured to provide a first fluid flow path through a wellbore, wherein the perforated basepipe has at least an impermeable section and at a permeable section; and

a plurality of walls inside the perforated basepipe to provide at least a second fluid flow path through the wellbore.

60. The apparatus of claim 59 wherein the perforated basepipe is a sand screen.

61. The apparatus of claim 59 wherein the plurality of walls comprises a first wall, a second wall and a third wall, wherein each of the walls are coupled between the perforated basepipe and the first wall, second wall, third wall, or combination thereof.

62. The apparatus of claim 59 comprising a redundant perforated basepipe configured to provide a third fluid flow path through the wellbore, the redundant perforated basepipe comprising at least a redundant impermeable section and at least a redundant permeable section, wherein the permeable section and the redundant permeable section are connected to provide another flow path between the perforated basepipe and the redundant perforated basepipe.

63. The apparatus of claim 62 wherein the basepipes are concentric.

64. The apparatus of claim 62 wherein the basepipes are eccentric.

65. The apparatus of claim 62 wherein the basepipes are adjacent.

66. The apparatus of claim 59 wherein the at least one wall comprises a plurality of walls between the first perforated basepipe or second perforated basepipe to redirect the fluid into a plurality of compartments.

67. The apparatus of claim 59 wherein the at least one wall forms a predefined shape in the perforated basepipe and comprises at least one of a permeable material, an impermeable material, and combination thereof.

68. A wellbore apparatus comprising:

a) a first flow joint in a wellbore, the first flow joint comprising at least one three-dimensional surface defining a first fluid flow path through the wellbore, at least one section of the first flow joint surface being permeable and at least one section of the first flow joint surface being impermeable;

b) a second flow joint in the wellbore, the second flow joint comprising at least one three-dimensional surface defining a second fluid flow path through the wellbore, at least one section of the second flow joint surface being permeable and at least one section of the second flow joint surface being impermeable;

c) wherein the first flow joint is eccentric to the second flow joint in the wellbore and at least one permeable section of the first flow joint is connected to at least one permeable section of the second flow joint thereby providing at least one fluid flow path between the first flow joint and the second flow joint.

69. The apparatus of claim 1 wherein the at least one wall forms a predefined shape and comprises at least one of a permeable portion, an impermeable portion, and combination thereof.

70. The apparatus of claim 1 wherein the first flow joint and the second flow joint are different lengths within the wellbore.

71. The apparatus of claim 1 wherein the first flow joint or second flow joint comprises a plurality of sections having a central opening through each of the plurality of sections.

72. The apparatus of claim 1 wherein the first flow joint or second flow joint is impermeable on at least one end of the first flow joint or second flow joint.

73. The apparatus of claim 20 wherein the at least one of first selectively perforated basepipe, the second selectively perforated basepipe, and combination is a sand screen.

74. The apparatus of claim 20 wherein the at least one wall forms a specific shape in the first selectively perforated basepipe and comprises at least one of a permeable material, an impermeable material, and combination thereof.

75. The apparatus of claim 20 wherein the first selectively perforated basepipe and the second selectively perforated basepipe are different lengths within the wellbore.

76. The method of claim 36 wherein the at least one wall forms a predefined shape in the first flow joint or second flow joint and comprises at least one of a permeable section, an impermeable section, and combination thereof.

77. The method of claim 36 wherein the first flow joint or second flow joint comprises a plurality of sections having a central opening through each of the plurality of sections.

78. The method of claim 36 wherein the first flow joint or second flow joint is impermeable on at least one end of the first flow joint or second flow joint.

79. The method of claim 44 wherein the at least one wall forms a shape within the first flow joint or second flow joint and comprises at least one of a permeable material, an impermeable material, and combination thereof.

80. A wellbore apparatus comprising:

a) a first flow joint in a wellbore, the first flow joint comprising at least one three-dimensional surface defining a first fluid flow path through the wellbore, at least one section of the first flow joint surface being permeable and at least one section of the first flow joint surface being impermeable;

b) a second flow joint in the wellbore, the second flow joint comprising at least one three-dimensional surface defining a second fluid flow path through the wellbore, at least one section of the second flow joint surface being permeable and at least one section of the second flow joint surface being impermeable;

c) wherein the first flow joint is external to the second flow joint in the wellbore and at least one permeable section of the first flow joint is connected to at least one permeable section of the second flow joint thereby providing at least one fluid flow path between the first flow joint and the second flow joint.

81. The apparatus of claim 80 wherein an annulus between the first flow joint and the second flow joint creates a third fluid flow path through the wellbore.

CLAIMS

What is claimed is:

1. A wellbore apparatus comprising:

a) a first flow joint in a wellbore, the first flow joint comprising at least one three-dimensional surface defining a first fluid flow path through the wellbore, at least one section of the first flow joint surface being permeable and at least one section of the first flow joint surface being impermeable;

b) a second flow joint in the wellbore, the second flow joint comprising at least one three-dimensional surface defining a second fluid flow path through the wellbore, at least one section of the second flow joint surface being permeable and at least one section of the second flow joint surface being impermeable;

c) at least one wall inside the first flow joint or the second flow joint to form at least a third fluid flow path; and

d) wherein at least one permeable section of the first flow joint is connected to at least one permeable section of the second flow joint thereby providing at least one fluid flow path between the first flow joint and the second flow joint.

2. The apparatus of claim 1 wherein the first and second flow joints are selectively perforated basepipes.

3. The apparatus of claim 1 wherein the first flow joint is adjacent to the second flow joint in the wellbore.

4. The apparatus of claim 1 wherein the first flow joint is concentric to the second flow joint in the wellbore.

5. The apparatus of claim 1 wherein at least one flow joint comprises joints of pipe.

6. The apparatus of claim 1 wherein the first flow joint is eccentric to the second flow joint in the wellbore.

7. The apparatus of claim 5 wherein the joints of pipe are connected using flexible joints.

8. The apparatus of claim 1 wherein the three-dimensional surface of the first and second flow joints are cylindrical.

9. The apparatus of claim 1 wherein at least one wellbore annuli is utilized as a flow joint.

10. The apparatus of claim 1 wherein at least one flow joint is a sand screen.

11 The apparatus of claim 10 wherein the sand screen is a wire-wrapped screen and the wires of the wire-wrapped screen are wrapped at varying pitches thereby creating varying levels of permeable sections and impermeable sections.

12. The apparatus of claim 1 further comprising at least one shunt tube in at least one flow joint.

13. The apparatus of claim 1 wherein the apparatus is used for producing hydrocarbons.

14. The apparatus of claim 1 wherein the apparatus is used for gravel packing a well.

15. The apparatus of claim 1 wherein at least one impermeable section of the first flow joint or the second flow joint and at least one permeable section of the first flow joint or the second flow joint are each at least 7.5 centimeters long.

16. The apparatus of claim 1 wherein at least one impermeable section of the first flow joint or the second flow joint and at least one permeable section of the first flow joint or the second flow joint are each at least 15 centimeters long.

17. The apparatus of claim 1 wherein at least one impermeable section of the first flow joint is adjacent to at least one permeable section of a third flow joint.

18. The apparatus of claim 1 wherein at any cross-section location of the apparatus, at least one wall of at least one flow joint is impermeable.

19. The apparatus of claim 1 wherein at any cross-section location at least one wall of at least one flow joint is impermeable and at least one wall of at least one flow joint is permeable.

20. A wellbore apparatus comprising;

a) a first selectively perforated basepipe inside a wellbore defining a first fluid flow path through the wellbore, with at least one section of the first selectively perforated basepipe being impermeable and at least one section of the first perforated basepipe being permeable;

b) a second selectively perforated basepipe inside the wellbore defining a second fluid flow path through the wellbore, with at least one section of the second selectively perforated basepipe being impermeable and at least one section of the second perforated basepipe being permeable;

c) at least one wall disposed inside and coupled to the first selectively perforated basepipe or the second selectively perforated basepipe to provide at least one additional fluid flow path; and

d) wherein at least one permeable section of the first selectively perforated basepipe and at least one permeable section of the second selectively perforated basepipe are connected to provide at least one flow path between the first selectively perforated basepipe and the second selectively perforated basepipe.

21. The apparatus of claim 20 wherein the basepipes are concentric.

22. The apparatus of claim 20 wherein the basepipes are eccentric.

23. The apparatus of claim 20 wherein the basepipes are adjacent.

24. The apparatus of claim 21 wherein the first selectively perforated basepipe is larger than the second selectively perforated basepipe and the at least one wall is coupled between the first selectively perforated basepipe and the second selectively perforated basepipe to provide at least one additional flow path inside the first selectively perforated basepipe.

25. The apparatus of claim 22 wherein the first selectively perforated basepipe is larger than the second selectively perforated basepipe and the at least one wall is coupled between the first selectively perforated basepipe and the second selectively perforated basepipe to provide at least one additional flow path inside the first selectively perforated basepipe.

26. The apparatus of claim 20 wherein the perforations of the first selectively perforated basepipe are chosen based on the relative amount of fluids that will flow through the at least one permeable section.

27. The apparatus of claim 20 wherein the wellbore annulus is utilized as an additional flow joint.

28. The apparatus of claim 20 further comprising at least one shunt tube in the first selectively perforated basepipe or the second selectively perforated basepipe.

29. The apparatus of claim 20 wherein at least three flow paths are available through the wellbore.

30. The apparatus of claim 23 wherein the first selectively perforated basepipe and the second selectively perforated basepipe are connected with flexible tubes.

31. The apparatus of claim 20 wherein at least one impermeable section of the first selectively perforated basepipe or the second selectively perforated basepipe and at least one permeable section of the first selectively perforated basepipe or the second selectively perforated basepipe are each at least 7.5 centimeters long.

32. The apparatus of claim 20 wherein at least one impermeable section of the first selectively perforated basepipe or the second selectively perforated basepipe and at least one permeable section of the first selectively perforated basepipe or the second selectively perforated basepipe are each at least 15 centimeters long.

33. The apparatus of claim 20 wherein at least one impermeable section of the first selectively perforated basepipe or the second selectively perforated basepipe is adjacent to at least one permeable section of a third selectively perforated basepipe.

34. The apparatus of claim 20 wherein at any cross-section location of the apparatus, at least one wall of the first selectively perforated basepipe or the second selectively perforated basepipe is impermeable.

35. The apparatus of claim 20 wherein at any cross-section location at least one wall of the first selectively perforated basepipe or the second selectively perforated basepipe is impermeable and at least one wall of the other one of the first selectively perforated basepipe and the second selectively perforated basepipe is permeable.

36. A method for completing a wellbore comprising:

a) providing a wellbore apparatus for producing hydrocarbons comprising a first flow joint in a wellbore, the first flow joint comprising at least one three-dimensional surface defining a first fluid flow path through the wellbore with at least one section of the first flow joint surface being permeable and at least one section of the first flow joint surface being impermeable, a second flow joint in a wellbore, the second flow joint comprising at least one three-dimensional surface defining a second fluid flow path through the wellbore with at least one section of the first second flow joint surface being permeable and at least one section of the first second flow joint surface being impermeable, at least one wall disposed in the first flow joint or the second flow joint to form at least a third fluid flow path, wherein at least one permeable section of the first flow joint is connected to at least one permeable section of the second flow joint thereby providing at least one fluid flow path between the first flow joint and the second flow joint;

b) installing the wellbore apparatus in the wellbore .

37. The method of claim 36 wherein installing the wellbore apparatus provides at least two separate flow paths in the wellbore with at least one connection permitting fluid flow between the first flow path and the second flow path.

38. The method of claim 36 wherein the apparatus is used for producing hydrocarbons.

39. The method of claim 36 wherein the apparatus is used for gravel packing a well.

40. The method of claim 36 further comprising producing hydrocarbons from the wellbore.

41. The method of claim 40 further comprising producing hydrocarbons from the wellbore apparatus after the first flow joint, second flow joint or third flow joint has been mechanically damaged.

42. The method of claim 36 further comprising disposing at least one shunt tube in at least one of the first flow joint and the second flow joint, and gravel packing the wellbore using the shunt tube in the first flow joint or the second flow joint.

43. The method of claim 36 wherein the first flow joint or the second flow joint is a sand screen; and further comprising installing a complete gravel pack during gravel packing operations after the sand screen has been mechanically damaged.

44. A method of flowing fluids in a wellbore comprising;

a) providing a wellbore with an apparatus comprising a first flow joint in a wellbore, the first flow joint comprising at least one three-dimensional surface defining a first fluid flow path through the wellbore with at least one section of the first flow joint surface being permeable and at least one section of the first flow joint surface being impermeable, a second flow joint in a wellbore, the second flow joint comprising at least one three-dimensional surface defining a second fluid flow path

through the wellbore with at least one section of the second flow joint surface being permeable and at least one section of the second flow joint surface being impermeable, wherein at least one permeable section of the first flow joint is connected to at least one permeable section of the second flow joint thereby providing at least one fluid flow path between the first flow joint and the second flow joint, and at least one wall inside the first flow joint or the second flow joint to provide at least a third fluid flow path.

45. The method of claim 44 further comprising producing hydrocarbons through the first flow joint or the second flow joint.

46. The method of claim 44 further comprising injecting fluids into the well through the first flow joint and the second flow joint.

47. A method of manufacturing a wire-wrapped screen, the improvement comprising;

wrapping the wire at varying pitches wherein at least one section of the wire wrapped screen is permeable and at least one section of the wire-wrapped screen is impermeable.

48. A wellbore apparatus comprising;

a first perforated basepipe configured to provide a first fluid flow path through a wellbore, wherein the first perforated basepipe has at least a first impermeable section and at least a first permeable section;

a second perforated basepipe configured to provide a second fluid flow path through the wellbore, wherein the second perforated basepipe has at least a second impermeable section and at least a second permeable section and the first permeable section and the second permeable section are connected to provide a flow path between the first perforated basepipe and the second perforated basepipe; and

at least one baffle disposed inside the first perforated basepipe or the second perforated basepipe to provide at least one additional fluid flow path.

49. The apparatus of claim 48 wherein the basepipes are concentric.

50. The apparatus of claim 48 wherein the basepipes are eccentric.

51. The apparatus of claim 48 wherein the basepipes are adjacent.

52. The apparatus of claim 48 wherein the at least one baffle is coupled between the first perforated basepipe and the second perforated basepipe to form compartments within the first perforated basepipe.

53. The apparatus of claim 48 wherein the at least one baffle comprises a first wall, a second wall and a third wall that are utilized to compartmentalized fluid flow paths within the first perforated basepipe or the second perforated basepipe.

54. The apparatus of claim 48 wherein the at least one baffle comprises at least one wall to at least partially divide the fluid flow.

55. The apparatus of claim 48 wherein the at least one baffle comprises a plurality of walls to create a plurality of compartments to redirect fluid from the wellbore.

56. The apparatus of claim 48 wherein the at least one baffle comprises a plurality of baffles disposed in axial locations within the first perforated basepipe or second perforated basepipe to redirect the fluid into a plurality of compartments.

57. The apparatus of claim 48 wherein the first perforated basepipe is a sand screen.

58. The apparatus of claim 48 wherein the at least one baffle forms a predefined shape and the at least one baffle comprises at least one of permeable surfaces, impermeable surfaces, and combination thereof.

59. A wellbore apparatus comprising:

a perforated basepipe configured to provide a first fluid flow path through a wellbore, wherein the perforated basepipe has at least an impermeable section and at a permeable section; and

a plurality of walls inside the perforated basepipe to provide at least a second fluid flow path through the wellbore.

60. The apparatus of claim 59 wherein the perforated basepipe is a sand screen.

61. The apparatus of claim 59 wherein the plurality of walls comprises a first wall, a second wall and a third wall, wherein each of the walls are coupled between the perforated basepipe and the first wall, second wall, third wall, or combination thereof.

62. The apparatus of claim 59 comprising a redundant perforated basepipe configured to provide a third fluid flow path through the wellbore, the redundant perforated basepipe comprising at least a redundant impermeable section and at least a redundant permeable section, wherein the permeable section and the redundant permeable section are connected to provide another fluid flow path between the perforated basepipe and the redundant perforated basepipe.

63. The apparatus of claim 62 wherein the basepipes are concentric.

64. The apparatus of claim 62 wherein the basepipes are eccentric.

65. The apparatus of claim 62 wherein the basepipes are adjacent.

66. The apparatus of claim 59 wherein the at least one wall comprises a plurality of walls between the first perforated basepipe or second perforated basepipe to redirect the fluid into a plurality of compartments.

67. The apparatus of claim 59 wherein the at least one wall forms a predefined shape in the perforated basepipe and comprises at least one of a permeable material, an impermeable material, and combination thereof.

68. A wellbore apparatus comprising:

a) a first flow joint in a wellbore, the first flow joint comprising at least one three-dimensional surface defining a first fluid flow path through the wellbore, at

least one section of the first flow joint surface being permeable and at least one section of the first flow joint surface being impermeable;

b) a second flow joint in the wellbore, the second flow joint comprising at least one three-dimensional surface defining a second fluid flow path through the wellbore, at least one section of the second flow joint surface being permeable and at least one section of the second flow joint surface being impermeable;

c) wherein the first flow joint is eccentric to the second flow joint in the wellbore and at least one permeable section of the first flow joint is connected to at least one permeable section of the second flow joint thereby providing at least one fluid flow path between the first flow joint and the second flow joint.

69. The apparatus of claim 1 wherein the at least one wall forms a predefined shape and comprises at least one of a permeable portion, an impermeable portion, and combination thereof.

70. The apparatus of claim 1 wherein the first flow joint and the second flow joint are different lengths within the wellbore.

71. The apparatus of claim 1 wherein the first flow joint or second flow joint comprises a plurality of sections having a central opening through each of the plurality of sections.

72. The apparatus of claim 1 wherein the first flow joint or second flow joint is impermeable on at least one end of the first flow joint or second flow joint.

73. The apparatus of claim 20 wherein the at least one of first selectively perforated basepipe, the second selectively perforated basepipe, and combination is a sand screen.

74. The apparatus of claim 20 wherein the at least one wall forms a specific shape in the first selectively perforated basepipe and comprises at least one of a permeable material, an impermeable material, and combination thereof.

75. The apparatus of claim 20 wherein the first selectively perforated basepipe and the second selectively perforated basepipe are different lengths within the wellbore.

76. The method of claim 36 wherein the at least one wall forms a predefined shape in the first flow joint or second flow joint and comprises at least one of a permeable section, an impermeable section, and combination thereof.

77. The method of claim 36 wherein the first flow joint or second flow joint comprises a plurality of sections having a central opening through each of the plurality of sections.

78. The method of claim 36 wherein the first flow joint or second flow joint is impermeable on at least one end of the first flow joint or second flow joint.

79. The method of claim 44 wherein the at least one wall forms a shape within the first flow joint or second flow joint and comprises at least one of a permeable material, an impermeable material, and combination thereof.

80. A wellbore apparatus comprising:

a) a first flow joint in a wellbore, the first flow joint comprising at least one three-dimensional surface defining a first fluid flow path through the wellbore, at least one section of the first flow joint surface being permeable and at least one section of the first flow joint surface being impermeable;

b) a second flow joint in the wellbore, the second flow joint comprising at least one three-dimensional surface defining a second fluid flow path through the wellbore, at least one section of the second flow joint surface being permeable and at least one section of the second flow joint surface being impermeable;

c) wherein the first flow joint is external to the second flow joint in the wellbore and at least one permeable section of the first flow joint is connected to at least one permeable section of the second flow joint thereby providing at least one fluid flow path between the first flow joint and the second flow joint.

81. The apparatus of claim 80 wherein an annulus between the first flow joint and the second flow joint creates a third fluid flow path through the wellbore.

ABSTRACT

A wellbore apparatus and method suitable for either wellbore completions and production. The completion and production apparatus comprises at least one primary flow joint (13), the primary flow joint comprising at least one three-dimensional surface defining a body capable of fluid flow with at least one permeable surface, and at least one secondary flow joint (15), the secondary flow joint comprising at least one three-dimensional surface defining a body capable of fluid flow with at least one permeable surface. The method comprises providing a completion and production apparatus comprising at least one primary flow joint and one secondary flow joint wherein multiple fluid flow paths can be provided. The production completion apparatus may be installed into the wellbore (10) to provide at least two flowpaths in the wellbore during well completion, injection and production.